

THURSDAY, SEPTEMBER, 9, 1880

ENGLISH AND AMERICAN BEE-KEEPING

The Bee-Keeper's Manual; or, the Honey Bee, its Management and Preservation. With a Description of the most Approved Hives and other Appliances of the Apiary. By the late Henry Taylor. Seventh Edition, modernised and very greatly enlarged by Alfred Watts. (London: Groombridge and Sons, 1880.)

British Bee-Farming, its Profits and Pleasures. By James F. Robinson. (London: Chapman and Hall, 1880.)

Manual of the Apiary. By A. J. Cook, Professor of Entomology in the Michigan State Agricultural College. Fifth Edition, revised, enlarged, mostly re-written, and beautifully illustrated. (Chicago, Illinois: Thomas G. Newman and Son, 1880.)

MR. WATTS' edition of Taylor's "Bee-Keeper's Manual" has been so copiously revised and added to that it is really a new work, embodying all the most recent discoveries and improvements in apian practice. For the amateur bee-keeper—as distinguished from the scientific student of bees on the one hand, and the mere honey manufacturer on the other—this volume is a most admirable guide. It is simple in arrangement, very clear in its descriptions, and copiously illustrated by really good woodcuts of every portion of the extensive apparatus used by the modern amateur. Commencing with a short account of the different kinds of honey-bee, and the main facts of its life-history, we are soon introduced to the mode of keeping bees, beginning with the old-fashioned straw hive, and successively pointing out the various improvements that have been effected. We then come to the different kinds of box, frame, and observatory hives, and the various systems of bee-management, all of which are explained and illustrated in the clearest and most intelligible manner. The latter half of the volume is devoted to a detailed account of the summer, autumn, winter, and spring management of bees; and this part is so full and so carefully written that it will prove of the greatest service to all young bee-keepers.

Mr. Watts does not seem quite so confident as most apianians of the superior qualities of the Ligurian over the common bee. He quotes, as "worthy of the most careful consideration from those interested in the subject," a statement that the former rob the latter of their honey, and that they are also far more liable to disease. The writer—a Scotchman who has closely studied the habits of bees—says:—

"All Ligurian fanciers claim for them that they work in wet or dry earlier and later than do the blacks. Now any one can see that as soon as there is honey in the flower, so soon will the black bee go for it, and so long as there is honey so long will the black remain gathering it. Since the Ligurian can no more make honey than the black, and since it finds honey after the blacks have failed, it must obtain it from some other source than the flowers. Ligurian bee-keepers tell me—and I see no reason to doubt the statement—that the Ligurian thrives amazingly for a time where plenty of black bees are kept, and that nearly in the same proportion to the number of black hives within reach, so will be the honey-producing powers

of the Ligurian. I have often seen them coming out of the black hives, and certainly they were not helping the blacks, because in nearly exact proportion as they increased in weight the blacks decreased; and this transfer of the honey is not always accompanied with fighting, the Ligurians having what all successful pilferers generally have—viz. the knack of introducing themselves unchallenged anywhere if what is wanted is to be had."

"British Bee-Farming" is a most excellent and practical work, written in the simplest style, and giving excellent directions to those who wish to keep bees for profit. We have seldom seen a book from which a beginner can obtain such exact information on all the necessary details of bee-management. Mr. Robinson strongly recommends a simple form of bar-hive, which he calls "the bee-farmer's hive," and which is figured so clearly that any village carpenter can make it; and by the use of this, and his equally simple and efficient "bee-farmer's honey extractor," he shows how a constant supply of pure honey can be obtained, week by week, without interfering with the bees' work or destroying any of the comb, the replacement of which in a small hive necessitates the consumption by the bees of twenty pounds of honey. A good deal of miscellaneous information on bees and bee-keeping is given in the second part of the work, but its chief value is that it well justifies its title, by showing in the briefest and clearest manner how bees may become a source of considerable profit as well as a continual pleasure.

Prof. Cook's volume differs considerably from the preceding, and indeed from any other English work on the subject, in its combination of science with utilitarianism, while the amateur pure and simple is hardly recognised at all. More than one-third of the book is devoted to an account of the natural history of the bee, its place in the animal kingdom, its anatomy, physiology, habits, and economy. Then follow the chapters on bee-keeping proper; and the author here addresses himself almost exclusively to those who make bee-keeping a business, and we are led to understand how much this branch of industry is advancing in America, where honey is now being manufactured on almost as large a scale as corn. An article in the *Times* last year informed us that a single bee-farm has 12,000 swarms, and keeps two steam-saws and nine men at work for five weeks in cutting up the timber for the 72,000 boxes in which the honey is packed for exportation. Prof. Cook accordingly has a chapter on "Marketing Honey," and instructs his readers in the art of "invigorating the market," "tempting the consumer," and other mercantile details; and throughout the book we find constant indications that bee-keeping is looked upon as a business rather than a hobby, and that in all its details economy of labour and materials must be studied, and all processes judged by the test of the maximum of production at a minimum of cost. A few extracts will give an idea of the style of the book.

After stating that a queen bee will often lay two or three thousand eggs a day, he remarks that this is nothing to the queen white ant, which lays 80,000 eggs a day, adding:—

"This poor helpless thing, whose abdomen is the size of a man's thumb, and composed almost wholly of eggs, while the rest of her body is not larger than the same in our common ants, has no other amusement; she cannot

walk; she cannot even feed herself or care for her eggs. What wonder then that she should attempt big things in the way of egg-laying? She has nothing else to do, or to feel proud of."

In the account of the formation of the comb the "pressure" theory is very properly rejected, but no reference is made to the complete explanation of the process given by Darwin, Waterhouse, and others. The mathematical accuracy of the cell is however disproved by the observations of Prof. Wyman, who showed by actual measurement that none of them were perfect hexagons, but that they varied in size, sometimes to the amount of one cell's width in ten, and commonly to half this amount. The rhombic bases of the cells also vary, and as this variation occurs gradually in passing from one part of the comb to another, it follows that whenever this happens the cells must diverge from the true hexagonal form. The supposed mathematical instinct of the bee has therefore no foundation to rest upon, and the beautiful explanation given by Mr. Darwin fully meets the actual facts.

An interesting chapter is devoted to "Honey Plants," the principal species from which the bees obtain their honey in America being figured. In the more northern States fruit-trees, willows, and sugar-maples, with bass-wood and white clover, are the most productive plants, while on the western prairies the thousands of acres of asters, solidagos, and eupatoriums afford an inexhaustible supply of honey not yet appropriated.

The illustrations of this book are often rude, and sometimes inaccurate. The honey-extractor (at p. 189) is described as acting by centrifugal force, but it is drawn square, and the comb so placed in it that it could not possibly revolve; while, at p. 128, the bottom-board described as having a bevelled notch for an opening to the hive, is shown with a triangular projection, owing to bad perspective in the drawing. These, however, are small faults; and the English bee-keeper will no doubt obtain many useful hints from this excellent little manual of bee-culture as practised by our ingenious and energetic cousins across the Atlantic.

A. R. W.

OUR BOOK SHELF

Rainfall of the East Indian Archipelago; First Year, 1879. By Dr. P. A. Bergsma, Director of the Batavia Observatory. (Batavia: At the Government Printing Office, 1880.)

AN extremely valuable system of rainfall observation has been established in the East Indian Archipelago under the superintendence of Dr. Bergsma, the well-known director of the Batavia Observatory, and the results of the first year's observations for 1879 are now before us in this octavo volume of 257 pages.

In the beginning of 1879 sixty rain-gauges were in operation, and by the end of the year the number had increased to 125. To these it is proposed to add other seventy new stations during 1880, thus raising the number of stations for the observation of the rainfall of the East Indian Archipelago to 195. Towards the securing of uniformity the same pattern of rain-gauge is used by all the observers, and the gauges are placed at the same height of $3\frac{1}{2}$ feet above the ground; but greater uniformity in the hour of observing, which is any hour from 6 to 9 a.m., is a desideratum. The stations extend from $95^{\circ} 20'$ to $120^{\circ} 53'$ E. long., and from $5^{\circ} 53'$ N. lat. to $10^{\circ} 10'$ S. lat., and as regards elevation they are at heights varying from the level of the sea to a height of 6,404 feet. Their

distribution among the islands is 76 on Java, 25 on Sumatra, 7 on Borneo, 4 on Celebes, and 4 on Billiton, 3 on Madeira, and 1 on each of the islands Riouw, Bangka, Ternate, Amboina, Banda, and Timor.

The daily rainfalls at each of the 125 stations during 1879, so far as observed, are printed *in extenso*, and a table is added showing the amounts and days of rainfall for each month and for the year. The largest rainfall for one day was 11.81 inches at Amboina on July 13; and it may be remarked that at the same place on the four days ending the 15th of the same month, 29.45 inches fell. The least annual rainfall at any station was 53.27 inches at Kotta Radja, and the largest 282.33 inches at Padang Pandjang. Of the 59 stations for which there are returns for the whole year, the amount exceeded 100 inches at 33, and 200 inches at 5 of the stations. The greatest number of days on which rain fell at any station was 274 at Soekawana, and the least 136 at Onrust. It is evident that this system of observation will by and by lay before us the observational data for the determination of the distribution of the important element of the rainfall, horizontally and vertically, over the land surfaces of this portion of the globe which excites so strongly the interest of the biologist, geologist, and geographer.

Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie. Herausgegeben von A. Engler. Erster Band, Heft i. ii. (Leipzig: Verlag von Wilhelm Engelmann, 1880.)

It is a question whether German serials devoted in part or wholly to botanical bibliography are not becoming too numerous, but, be that as it may, this new venture is so circumscribed in its scope that it recommends itself to a large section of botanists in this country whose labours are to a great extent within its scope. Engler's "Botanische Jahrbücher" are to be exclusively devoted to systematical, historical, and geographical botany, and will contain original articles in English, French, or German, as well as a review of current literature. Under Dr. Engler's painstaking editorship we think success should attend the undertaking. The parts are not to appear at fixed intervals, nor necessarily to be uniform in size; but the limit of the interval is from three to six months, and of the size three to four sheets. The contributors to the first part are:—Oswald Heer, on the history of the ginkgo-like trees; Alphonse de Candolle, on some points of botanical nomenclature; Eug. Warming, on the results of recent investigations of the flora of Greenland; O. Beccari, on the phytogeography of the Malayan Peninsula; A. Engler, diagnoses of some new *Burseraceae* and *Anacardiaceae*, and a review of the more important botanical works published in 1879. It should be mentioned that the contributions of A. de Candolle and O. Beccari are abstracts of and extracts from what has appeared elsewhere, though this fact does not diminish their value. On the contrary, they are thus brought to the knowledge of many who would otherwise not have an opportunity of reading them.

W. B. HEMSLEY

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Conditions Necessary for the Existence of Matter in the Liquid State—Existence of Ice at High Temperatures

NUMEROUS experiments which I have made during the last few weeks on the boiling points of substances under low pres-